

CLAIMS

1. An n-phase ozone generator comprising:

an ozone power supply for rectifying a voltage having a commercial frequency, causing an inverter to convert the rectified voltage to an AC voltage having a predetermined frequency, causing a transformer and a reactor to convert the AC voltage having the predetermined frequency to a high AC voltage, and outputting the resulting high AC voltage and a low voltage;

a discharge chamber having a high-voltage terminal for inputting the high AC voltage of the ozone power supply and a low-voltage terminal for inputting the low voltage; and

a plurality of multi-layer flat-plate ozone generator units that are stacked in the discharge chamber and formulated by alternately stacking a plurality of flat-plate high-voltage electrodes and low-voltage electrodes,

wherein the ozone power supply includes an n-phase inverter for converting a rectified voltage to an n-phase AC voltage having a predetermined frequency and outputting an n-phase AC voltage waveform; n reactors and an n-phase transformer for converting an n-phase AC voltage, which is output from the n-phase inverter, to an n-phase high AC voltage; n high-voltage terminals for outputting an n-phase

high AC voltage; and a low-voltage terminal for outputting a low voltage sharing a common potential with n high voltages;

wherein the plurality of multi-layer flat-plate ozone generator units are electrically divided into n pieces within the discharge chamber, high-voltage electrodes of an ozone generator unit being handled as the same high-voltage potentials;

wherein, from each ozone generator unit, n high-voltage electrode terminals and one low-voltage electrode terminal, which is common to all low-voltage electrodes of the ozone generator units, are pulled out to connect n high-voltage terminals for an ozone power supply output to n high-voltage electrode terminals of the ozone generator units; and

wherein one low-voltage electrode terminal of the ozone generator units is connected to a low-voltage terminal of the ozone power supply output so that each ozone generator unit invokes an n-phase AC discharge to generate ozone.

2. The n-phase ozone generator according to claim 1, wherein the ozone power supply is positioned between the n-phase transformer and the plurality of ozone generator units, and includes a low-voltage electrode terminal that is common to all low-voltage electrodes of the ozone

generator units and n reactors that are connected in parallel with the n ozone generator units.

3. The n-phase ozone generator according to claim 1 or 2, wherein the ozone power supply includes a time division device that is capable of equally dividing the time into 3 to n phases; and wherein, when a designated phase count signal is entered into the time division device from the outside, the time division device issues an equally-time-divided signal to an inverter so that variable control can be exercised for an arbitrary phase while maintaining balance gradually for 3 to n phases.

4. The n-phase ozone generator according to claim 1, 2, or 3, wherein n reactors and n transformers of the ozone power supply are formed when a plurality of U- or L-shaped cores, around which a transformer coil or a reactor coil is wound, are closely attached to the opposite side around an I-shaped core having a polygonal cross section; and wherein coils of the n transformers or of the n reactors are Δ -connected or star-connected.

5. The n-phase ozone generator according to claim 4, wherein the n reactors or n transformers of the ozone power supply are configured so that the U- or L-shaped cores that are closely attached to the opposite side around the polygonal I-shaped core can be readily mounted and demounted; and wherein a transformer that is configured as

an n-phase transformer or reactor can be converted to a 3-to n-phase transformer or reactor.

6. The n-phase ozone generator according to claim 1, 2, 3, 4, or 5, wherein a fuse or a breaker is provided between n high-voltage terminals of the ozone power supply and n high-voltage electrode terminals of the ozone generator units.

7. The n-phase ozone generator according to claim 1, 2, 3, 4, or 6, wherein the output sections of n high-voltage terminals of the ozone power supply are provided with a current detector; and wherein, when a current flow in a certain phase exceeds a predetermined value, the affected phase is electrically cut off so that an n-1 phase operation is performed.

8. The n-phase ozone generator according to claims 1, 2, 3, 4, 6, and 7 wherein output sections of n high-voltage terminals of the ozone power supply and a low-voltage potential output section are provided with a voltage detector; and wherein, when a voltage applied to a low-voltage potential and a certain phase is below a predetermined value, the affected phase is electrically cut off so that an n-1 phase operation is performed.